sions and eccentricity of the orbit of the comet are now:—

Perihelion distance ...	1·3393	Semi-axis major ...	2·9956
Aphelion ,, ...	4·6518	,, minor ...	2·4961
Eccentricity ...	0·55289		

The interval between the perihelion passages in 1873 and 1878 is 1899·78 days.

BIOLOGICAL NOTES

The Primary Germ-Layers and the Origin of the Male and Female Reproductive Elements.—Prof. Edouard Van Beneden, of Liége, three years ago observed that in the marine hydroid polyp Hydractinia the cells forming the testis and giving rise to spermatozoa, were derived from an ingrowth of the outer of the two primary cell-layers which form the foundation of all higher animal bodies, whilst the ova, he found, were simply cells of the inner primitive layer. This complementary function of the ectoderm and endoderm in Hydractinia led him to frame the hypothesis that throughout the animal kingdom the outer cell-layer is male in function, and the inner cell-layer female. On reviewing the facts known as to the derivation of the sexual cell-elements in various groups of animals, he was able to show a considerable amount of evidence in favour of the view that the testis is always ectodermal and the ovary always endodermal. Though accurate observations in this matter are excessively difficult, and definite knowledge as to the facts, in nearly all cases, is still wanting, yet Prof. Van Beneden's hypothesis was plausible and worthy of full consideration. It has been adopted by Gegenbaur in the last edition of his "Grundriss." The hydroid polyps consisting, as they do for the most part, of the two primary cell-layers in a very slightly differentiated condition, present the most ready field for the further testing of Van Beneden's hypothesis. The observations of Kleinenberg on Hydra were opposed to it. According to these *both* the sperm-cells and the egg-cells of Hydra develop from the ectoderm. Mr. J. Ciamician, of Vienna, has made a special study of this question in certain genera of hydroids (*Zeitsch. wiss. Zoologie*, 1878, part 4), and has published careful drawings in support of his statements. In *Tubularia mesembryanthemum*, assuming the accuracy of Mr. Ciamician's drawings, both female and male reproductive cells develop from a hollow in-growth of the ectoderm (the gonophors of the two sexes being distinct), which at first depresses the endoderm, but is afterwards itself flattened out by the up-growth of the endodermal layer of the spadix. In *Eudendrium ramosum* the ova develop from cells of the ectoderm, and the sperm-cells from cells of the endoderm, precisely the reverse of the relations detected by Van Beneden in Hydractinia. It seems hardly possible to interpret Mr. Ciamician's drawings of Eudendrium in any other sense than that which he himself adopts; the cell-layers at all stages are as clear in this species as they possibly can be. In the female gonophors of Hydractinia, Van Beneden saw an in-pushing of ectoderm at the apex developed in the same place as the in-pushing at the apex of the male gonophor, from which the sperm-cells developed. Van Beneden interpreted the rudimentary in-pushing in the female gonophor as a survival of a primitive hermaphrodite condition of the gonophors. Ciamician considers, on the contrary, that this ectodermal in-pushing is only the commencement of the formation of a medusa (in fact, the space between umbrella-margin and manubrium), which, instead of being completed, subsides into the condition of a medusoid gonophor. Hence, in place of a constant law of ectoderm being male and endoderm being female, we have in the three genera Tubularia, Hydractinia, and Eudendrium, the following variations respectively:—1, ectoderm male and female; 2, ectoderm male, endoderm female; 3, ectoderm female, endoderm male. The only possible generalisation from these facts is that of Ciamician, viz., that primitively the sexual functions are not assigned exclusively to cells of either layer: ectoderm may produce both male and female elements, and so may endoderm. With increased development and specialisation of structure, the production of reproductive elements would become limited to particular tracts of cells, and these would be necessarily *either* exclusively endoderm-cells or exclusively ectoderm-cells, but might be either one or the other indifferently even in closely-allied genera; and might be the same or complementary for the ovary and testis respectively. Nevertheless it must be admitted that though such indefiniteness in the relation of the sexual glands to the primitive cell-layers might be expected in Cœlentera where the differentiation of the two layers is at its commencement (both layers, for instance, developing nematocysts), yet in the higher groups of the animal kingdom we should be justified in looking for absolute constancy in the derivation of ovary and testis respectively from one or other (the same or diverse) of the two cell-layers—and we have not ground for supposing that this derivation would be the same in each of the great phyla until we can show that it is more constant in the Vermes than in the Cœlentera. E. R. L.

The Toilet Habits of Ants.—The Rev. H. C. McCook, of Philadelphia, eulogises the neatness of the agricultural ant, as observed in confinement at any rate. The most minute particles of dirt are carefully removed, and the whole body is frequently and thoroughly cleansed, especially after eating and sleeping. They assist each other in the general cleansing, and the attitude of the ant under operation is one of intense satisfaction, like that of a family dog being scratched, a perfect picture of muscular surrender and ease. Mr. McCook has seen an ant kneel down before another, and thrust forward the head under the face of the other, and lie motionless, expressing quite plainly the desire to be cleansed; the other ant understood this, and went to work. Sometimes this is combined with acrobatic feats, in which these ants excel, jumping about and clinging to blades of grass in a remarkable fashion. Sometimes the cleansing ant hangs downward from the grass, and to her the ant operated upon clings, reaching over and up with great agility to submit to her friend's offices. Evidently moisture from the mouth is used for washing. Mr. McCook has observed most minutely the whole of these processes, which are recorded in the Philadelphia Academy's *Proceedings* for this year. He suggests that with ants as with the human kind an artificial condition induces greater attention to personal appearance.

The Mode of Recognition among Ants.—The combats and communications of ants are among the most interesting and mysterious phenomena. The Rev. H. C. McCook has given an account to the Academy of Natural Sciences at Philadelphia of some experiments he has made to determine what is the mode of recognition among ants. He has studied the pavement ants (*Tetramorium cæspitum*), which he has observed engaged in continued combat for over a fortnight, the warriors being only the workers or neuters. There is no distinguishable difference between the ants of the fighting parties, yet they recognise each other infallibly as friend or foe. They challenge all comers with their antennæ; if they are friends, they pass on; if foes, they straightway interlock and "fall to." Sometimes many ants are congregated against one, which is being torn limb from limb. Mr. McCook surmised that recognition was based upon a certain odour emitted by the respective factions. He found that if they were enveloped in an odour of eau-de-Cologne, while not at all deprived of activity, all became harmonious; those who were previously engaged in

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battle unclasped one another, and they went on for several days amicably feeding, burrowing, and building. The same experiment was tried on the carpenter ants, which behead their enemies; their hostile proceedings were not stopped by eau-de-Cologne.

THE SNARE OF THE BASILICA SPIDER.—Science is under obligations to Mr. McCook of Philadelphia, for his study of the marvellous constructions of the Basilica spider (genus *Epeira*), near the Colorado River, Texas. It was first found about two feet from the ground upon a bush. The general form is pyramidal, the upper part of it a mass of straight lines knotted and looped, and crossing in all directions. Within this is suspended an open silk dome, of a vast number of radii crossed by regular concentrics. The dome was suspended from the upper erection so as to be perfectly steadied and kept in form. Beneath the dome was a light sheet of irregular cobweb. The spider itself is very beautifully coloured. This form appears to be a capital specimen of transition between the orb-weavers and the line-weavers. It has the characteristics of the line-weavers, namely, right lines and sheet-web in exact detail, and dome-shaped web in outline; it also has the geometric web of the orb-weavers, or radiating lines regularly crossed by concentrics. An allied species (*Epeira globosa*) is an orb-weaver, adding to the simple orb an open but distinct tube reaching almost to the centre of the web, with a free ray running along the floor of the tube, kept taut by the fore feet of the spider. An insect struggling in the web communicates the motion directly to the spider, which rushes along the covered gangway to its prey. Sometimes the gangway is imperfect, or even wholly omitted. The orb in the basilica spider appears to be the chief means of capture, the dome the dwelling-place, and the upper pyramid a suspension for this, and a protection against enemies.

SEXUAL CONDITIONS IN THE RED MAPLE.—It is commonly stated that maples bear hermaphrodite, male, and female flowers, but Mr. Thomas Meehan, of Philadelphia, asserts that the red maple is, according to his observations, really diœcious, having only flowers of one sex on the same tree. But the male and female flowers are similar in outward appearance at first opening, except that the small pistil is not developed in the male flowers. The female flowers have anthers of full size, and are supposed to be of both sexes, but the fact is that the anthers do not develop after the flower has opened, and shed no pollen. This is a very remarkable survival from a condition when the flowers were perfect. It is not uncommon to find trees, originally female, sending forth male branches, but Mr. Meehan has not found male trees produce female branches. The male flowers were found fragrant, the female not so.

GEOGRAPHICAL NOTES

UNDER the title of "Naturalists in the North West," a Sydney paper has recently published some interesting articles, the last of which relates to Mr. Miclucho-Maclay's account of the manners and customs of what he calls the Papuans of the Maclay coast. Their food consists mainly of vegetable products, but they have also some animal food, though it is somewhat scarce. Many of their domestic implements are of a very primitive nature; a flat splint of kangaroo bone forms a knife, of which a large kind is made from a smooth shell; axes are made sometimes of agate, and a few large ones, 3 inches wide, are kept as public property in each village. The dress of these natives is the *mal*, a piece of cloth prepared like the tapas of the Polynesians, from the bark of trees. The men all carry the *jambi* and the *gun*, to supply the want of pockets, the former being a bag suspended from the neck, and containing tobacco, &c., and the latter one woven of different coloured threads, and ornamented with shells. The *gun* is slung over the left shoulder, and contains the box of lime, betel-nut, knives, bamboo boxes of red and black dyes, &c. The natives also wear bracelets of bark or grass above the elbows, into which the *dougan* is thrust, and implements or weapons are also placed in the bangles on their legs. Wild boar's tusks are highly prized as manly ornaments to be worn on the chest, and ear-rings of tortoise-shell, bamboo, stones, or flowers, are all considered the proper adornment of the men. The women do not decorate themselves to the same extent, but they have cords from the upper part of one ear passing over the forehead to the other, and also bunches of dogs' teeth hanging from the lobes of the ears; they carry two bags, in one of which they place provisions and in the other their young infants or some pet pigs or puppies. Their huts and villages are situated in groups round clearings in the forest, and the plantations are usually at some distance. They have three sorts of houses—for the single people, the families, and a common house, principally used by the bachelors. These habitations do not resemble the pile-dwellings of the Western Papuans, and are only slightly raised above the ground. In each cluster of huts is a gong, like a boat raised on trestles, which, when struck in the right place, emits so great a volume of sound that it can be heard at a distance of six miles. It may be mentioned that these people have no means of obtaining fire, and frequently have to go to the hill tribes, who are acquainted with a cumbersome mode of friction by which they obtain a light.

GREAT exertions are being made by the Marquis de Croizier, and others, to ensure the success of the coming International Congress of Commercial Geography, which will be opened at Paris on September 23, under the presidency of M. Meurand, of the French Foreign Office. Numerous foreign societies have been invited to send representatives to the Congress, and we believe that the Royal Geographical Society will be represented by some members of their Council. The programme of the Congress is an extensive one, the numerous subjects proposed for discussion being arranged under the following five heads: Explorations et Voies Commerciales; Produits Naturels et Manufacturés; Emigration et Colonisation; Enseignement; and Questions Générales. A detailed programme and a *résumé* of the proceedings of the Congress will be published each day and forwarded to all the members. The meeting will be brought to a close on September 28.

AT a recent meeting of delegates of the German African Society at Berlin, it was resolved to grant the sum of 10,000 marks (500*l.*) to the International Association for the Exploration of Africa, and also to support Dr. Buchner, who is about to start for a tour through the districts lying south of the Congo River. The reports recently received from Herr Schütte, the engineer of the society, who is now at the Congo, continue to be favourable, and are accompanied by excellent maps of the districts he visits.

DR. OTTO FINSCH, the Director of the Natural History Museum of Bremen, will start for a scientific expedition to Australia at the end of this year; he is sent out by the Royal Academy of Sciences of Berlin, who will defray his expenses from their Humboldt fund.

THE ELASMOTHERIUM

AMONG the extinct animals of the diluvial age, few have left such scanty remains as the elasmotherium. At the beginning of the present century Fischer von Weldheim, when examining the palæontological collections of the University of Moscow, came across the half of the under-jawbone of an unknown animal, to which he assigned a place between the rhinoceros and elephant. The name elasmotherium was given to the new species,

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